



لجان الشفقات

# STATISTICS



MORPHINE ACADEMY

MORPHINE  
ACADEMY

# Pharmaceutical Statistics

## Lecture 5

### Descriptive statistics

### Measures of Dispersion

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تشنت طبيعة في data

كيف بدى اميز بين data اذا فيها تشنت او لا



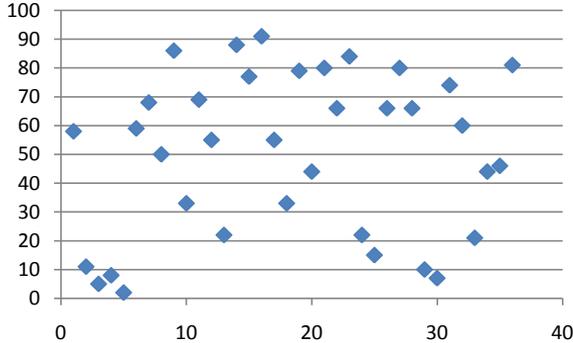


S.d اعلى

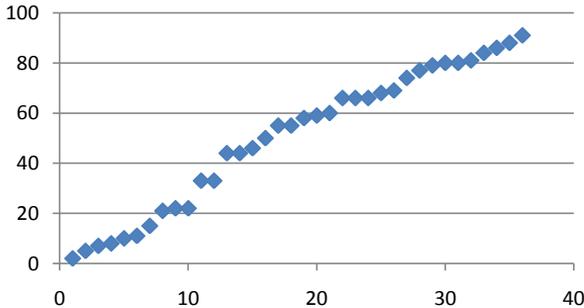
تشتت اكثر

# More variability

تشتت اكثر لانو نقاط نقاط بعيدة



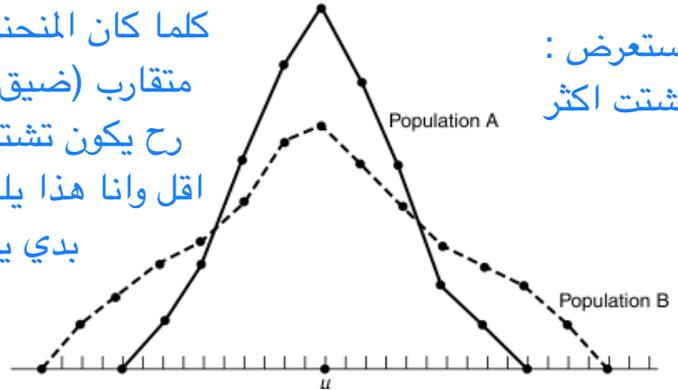
# Less variability



Population B, which is more variable than population A.

كلما كان المنحنى متقارب (ضيق) رح يكون تشتت اقل وانا هذا يلي بدى ياه

مستعرض : تشتت اكثر



اقل تشتت  
اقل انحراف معياري

Close dispersion

اكثر تشتت ، اكثر انحراف معياري

Wide dispersion

Same center, different variation / dispersion

Two frequency distributions with equal means but different amounts of dispersion.

# Indicators of dispersion

- Variation in experiments or in any assay is due to several reasons as <sup>تباين في تجارب</sup> اسباب عدة
- The instrument used for analysis. <sup>اداة</sup> <sup>تحليل</sup> اداة المستخدمة في تحليل
- The analyst performing the assay. <sup>المحلل الذي يجري اختبار</sup>
- The particular sample chosen. <sup>العينة المختارة</sup>
- Unidentified error <sup>خطأ غير محدد</sup> commonly known as noise.

Variation is an inherent characteristic of experimental observations.









## 2. The Variance:

**EXAMPLE:**

$$S^2 = \frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n - 1}$$

- Find Sample Variance of ages (5,7,8,12,6,9,11,6).

**Solution:**

$$\bar{x} = (5+7+8+12+6+9+11+6)/8 = 8$$

- $S^2 = [(5-8)^2 + (7-8)^2 + (8-8)^2 + (12-8)^2 + (6-8)^2 + (11-8)^2 + (6-8)^2] / 7$
- $S^2 = 9+1+0+16+4+1+9+4 / 7$
- $= 44/7$
- $= 6.28$















- Suppose two samples of human males yield the following data:

	Sampe1	Sample2
Age	25-year-olds	11year-olds
Mean weight	145 pound	80 pound
Standard deviation	10 pound	10 pound

**Question: examine the sample that has more variability?**

**A comparison of the standard deviations might lead one to conclude that the two samples possess equal variability.**



